

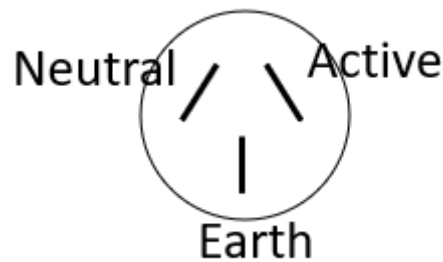


### Lesson 10 – Answers

Q1 Complete the following table with regards to 230 V wiring.

Wire	Colour	Voltage to Ground
Active	Brown	230 V
Neutral	Blue	0
Earth	Yellow and green	0

Q2 Looking at the pin end of a three-pin plug, identify the terminals.



Q3 What is a power supply?

**A power supply is a device that provides the required electric power for an electrical load.**

Q4 What are the advantages of a linear power supply.

#### Advantages of LPS

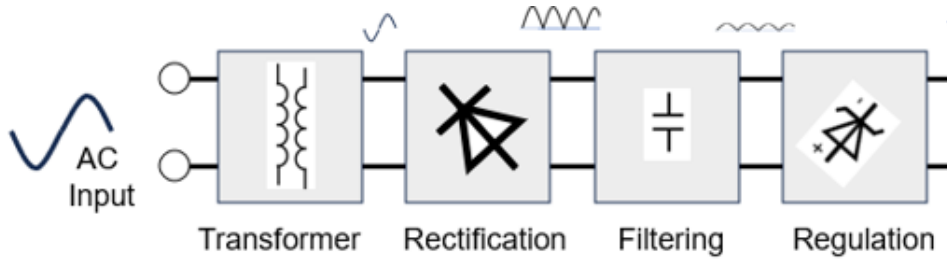
- The power supply is continuous.
- The circuitry is simple.
- These are reliable systems.
- This system dynamically responds to load changes.
- As the components operate in linear region, the noise is low.
- The ripple is very low in the output voltage.

Q5 What are the disadvantages of a switch mode power supply?

#### Disadvantages of SMPS

- The noise is present due to high frequency switching.
- The circuit is complex.
- Produces electromagnetic interference.

Q6 What are the five zones of a linear power supply and explain each?



Q7 What is the difference in the output of a half wave rectifier compared to a full wave rectifier?

**Half wave has alternat peaks and a full wave has continual peaks.**



$E_{Peak} = 1.4 \times E_{RMS}$   
 $E_{AV} = 0.45 \times E_{RMS}$   
 $E_{PRV} = 1.4 \text{ to } 2.8 \times E_{RMS}$   
 Ripple = 50 Hz

$E_{Peak} = 1.4 \times E_{RMS}$   
 $E_{AV} = 0.9 \times E_{RMS}$   
 $E_{PRV} = 2.8 \times E_{RMS}$   
 Ripple = 100 Hz

Q8 Describe how a full wave rectifier works.

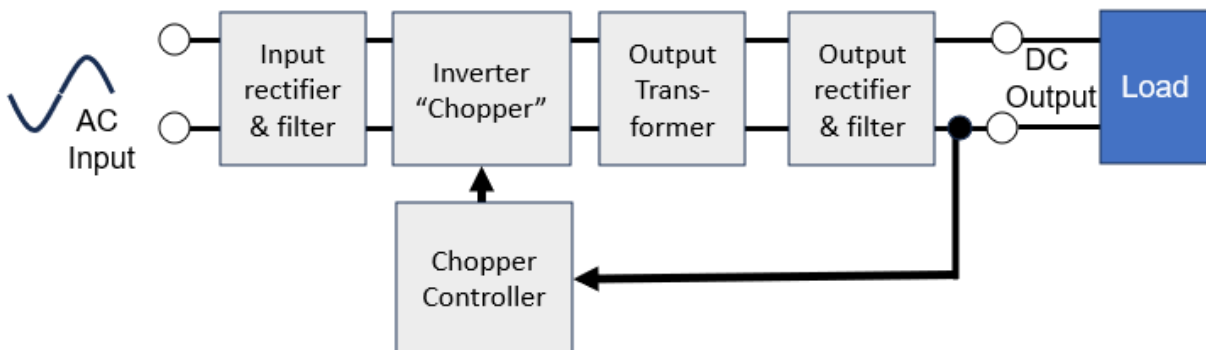
**A bridge rectifier is a circuit of four diodes that is used in converting alternating current (AC) from the input terminals to direct current (DC) on the output terminals.**

Q9 What size filter capacitor is needed to restrain the ripple voltage to 0.25 V with a load of 200 mA and the frequency of 100 Hz?

$$C = \frac{I \times t}{E}$$

$$C = (0.2 \times 0.01) / 0.25 = 0.008 \text{ or } 8 \text{ mF capacitor}$$

Q10 Draw the block diagram of a SMPS and name the parts.



Q11 Why is a RCD better than a fuse?

**The RCD is faster acting and prevents the full current of a fuse passing through the short.**

Q12 Calculate a possible filter capacitor for the following output.

- Current draw is 1.5 A
- Ripple frequency is 100 Hz  $1/100 = 0.01$  Sec
- P to P voltage is 0.5 V

$$\begin{aligned} C &= (1500 \times 0.01) / 0.5 \\ &= 15 / 0.5 = 7.5 \text{ mF} \end{aligned}$$

